

REMARKS

Claims 1-5, 8-12, and 15-23 are pending. The Examiner is respectfully requested to reconsider and withdraw the outstanding rejections in view of the amendments and remarks contained herein.

REJECTION UNDER 35 U.S.C. §102

Claims 17 and 19-22 stand rejected under 35 U.S.C. § 102(e) as being anticipated by Tewfik et al. (U.S. Pat. No. 6,442,283). This rejection is respectfully traversed.

Tewfik et al. is generally directed toward multimedia data embedding. In particular, Tewfik et al. is directed toward embedding data in the spectral domain. However, Tewfik et al. does not teach embedding data in the transform domain (e.g., cepstrum or linear prediction residue domain) by manipulating the statistical mean of selected transform coefficients, and applying a scrambling technique to the transform coefficients with a scrambling filter kept as a secret key by a content owner.

Applicant's claimed invention is generally directed toward audio data hiding. In particular, Applicant's claimed invention is directed toward embedding data in the transform domain (e.g., cepstrum or linear prediction residue domain) by manipulating the statistical mean of selected transform coefficients, and applying a scrambling technique to the transform coefficients with a scrambling filter kept as a secret key by a content owner. For example, independent claim 17, as amended, recites "embedding the hidden data in the linear prediction residue domain via parametric representation of the audio signal by manipulating statistical mean of selected transform coefficients, and applying a scrambling technique to the transform coefficients with a scrambling filter

kept as a secret key by a content owner". Support for the amendment may be found in the originally filed specification at page 2, line 20 through page 3, line 9, and page 10, line 20 through page 11, line 7. Accordingly, Tewfik et al. does not teach all of the elements recited in independent claim 17.

This difference is significant because statistical mean of selected transform coefficients typically experience small variation after most common signal processing. But an intentional attacker might be able to use a similar mean manipulation strategy to remove/modify embedded data. However, since the key controlled scrambling filter is kept away from the attacker, it becomes difficult to attack the above scheme. Meanwhile, testing results indicate that scrambling also shows the advantage of producing more favorable audio quality for the LP residue domain approach. Thus, the present invention obtains a significantly different and advantageous solution to the problem of embedding data in the transform domain than that obtained by Tewfik et al.

Accordingly, Applicant respectfully requests the Examiner reconsider and withdraw the rejection of independent claim 17 under 35 U.S.C. § 102(e), along with rejection on these grounds of all claims dependent therefrom.

REJECTION UNDER 35 U.S.C. §103

Claims 1-5, 8-12, 15-16, 18, and 23 stand rejected under 35 U.S.C. §103(a) as obvious over Tewfik et al. (U.S. Pat. No. 6,442,283) in view of Sharma et al. (U.S. Pat. No. 6,480,825). This rejection is respectfully traversed.

For discussion of Tewfik et al., Applicant respectfully directs the Examiner's attention to remarks detailed above with respect to rejection under 35 U.S.C. § 102.

Sharma et al. is generally directed toward detecting a recorded voice. In particular, the Examiner relies on Sharma et al. to teach the cepstrum and linear prediction residue domains as types of transform domains. However, neither Tewfik et al. nor Sharma et al., together or combined, teach, suggest, or motivate embedding data in the transform domain (e.g., cepstrum or linear prediction residue domain) by manipulating the statistical mean of selected transform coefficients, and applying a scrambling technique to the transform coefficients with a scrambling filter kept as a secret key by a content owner.

Applicant's claimed invention is generally directed toward audio data hiding. In particular, Applicant's claimed invention is directed toward embedding data in the transform domain (e.g., cepstrum or linear prediction residue domain) by manipulating the statistical mean of selected transform coefficients, and applying a scrambling technique to the transform coefficients with a scrambling filter kept as a secret key by a content owner. For example, independent claim 1, as amended, recites "embedding the hidden data in one of the linear prediction residue domain and the cepstrum domain via parametric representation of the audio signal by manipulating statistical mean of selected transform coefficients, and applying a scrambling technique to the transform coefficients with a scrambling filter kept as a secret key by a content owner". Independent claim 11, as amended, recites similar subject matter. Support for the amendments may be found in the originally filed specification at page 2, line 20 through page 3, line 9, and page 10, line 20 through page 11, line 7. Accordingly, Tewfik et al. and Sharma et al. do not teach, suggest, or motivate all of the elements recited in independent claims 1 and 11.

These differences are significant because statistical mean of selected transform coefficients typically experience small variation after most common signal processing. But an intentional attacker might be able to use a similar mean manipulation strategy to remove/modify embedded data. However, since the key controlled scrambling filter is kept away from the attacker, it becomes difficult to attack the above scheme. Meanwhile, testing results indicate that scrambling also shows the advantage of producing more favorable audio quality for the LP residue domain approach. Thus, the claimed invention obtains a significantly different and advantageous solution to the problem of embedding data in the transform domain than that obtained by Tewfik et al.


Accordingly, Applicant respectfully requests the Examiner reconsider and withdraw the rejection of independent claims 1 and 11 under 35 U.S.C. § 103(a), along with rejection on these grounds of all claims dependent therefrom.

CONCLUSION

It is believed that all of the stated grounds of rejection have been properly traversed, accommodated, or rendered moot. Applicant therefore respectfully requests that the Examiner reconsider and withdraw all presently outstanding rejections. It is believed that a full and complete response has been made to the outstanding Office Action, and as such, the present application is in condition for allowance. Thus, prompt and favorable consideration of this amendment is respectfully requested. If the Examiner believes that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at (248) 641-1600.

Respectfully submitted,

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